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### COMPLETE SPECIFICATION.

#### Improvements in and relating to Beds and Fittings for the Use of Invalids and the like.

I, WILLIAM ABBOT NASON, residing at Algonquin, Kane County, Illinois, United States of America, Physician, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement.

5 The purpose of this invention is to provide an invalid bed with improved means for accommodating a bedridden patient and permitting surgical attention to such patient without the use of bed-pans or like appliances which are otherwise necessary. The invention consists of new and simplified means for operating  
10 a plug or closure in a mattress aperture, and for upholding a vessel in such aperture, and of withdrawing the same without disturbing the patient, and of specific details of construction which are set out in the claims.

In the drawings Figure 1 is a side elevation of an invalid bed having my invention, the mattress plug being shown in the aperture of the mattress, and the vessel carrier and vessel being out of operation.

15 Figure 2 is a longitudinal section showing the mattress plug withdrawn and the vessel held in operative position by the carrier.

Figure 3 is a transverse section at the line 3—3 on Figure 2, omitting the vessel and carrier.

Figure 4 is a partly sectional detail elevation of the crank shaft structure,  
20 each pivotal bearing or junction being shown on axial section.

Figure 5 is a side elevation of a modified vessel carrier.

Figure 6 is a detail elevation showing the pivot bearing clamp applied to a cylindrical rail.

A is a mattress having an aperture, *a*, adapted to be occupied by the plug A<sup>1</sup>.  
25 B represents the mattress support, which is shown as a common form of woven-wire spring, having aperture corresponding to that of the mattress. B<sup>1</sup>, B<sup>1</sup>, are the side rails of the mattress supporting spring. C is a support for the plug A<sup>1</sup>, which is preferably made of perforated sheet metal rendered more rigid longitudinally by angle iron bars, C<sup>1</sup>, C<sup>1</sup>, the whole structure, consisting of said plate  
30 and bars, constituting a flat link which connects the wrists of cranked shafts hereinafter described, by which the plug is operated. For convenience of construction and adaptation to beds of different widths and having the aperture at different positions in the width, I have shown these cranked shafts as made up of adjustable parts. The description of one of the cranked shafts will suffice for  
35 both. Each shaft consists of two crank elements, D, D, which at one end are adapted to be journalled in line on opposite sides of the bed, the boss or hub D<sup>1</sup> of each element constituting or representing the shaft proper, the boss D<sup>2</sup> at the opposite end being apertured parallel to the shaft axis to receive the adjustable wrist D<sup>3</sup>. Such wrist is a rod, whose length is substantially the width of the  
40 narrowest bed to which the device may be applied, the range of adjustment which it may have in and through the boss D<sup>2</sup> being from a short engagement sufficient to permit it to be secured by the set screw *d*<sup>3</sup>, to a maximum protrusion through the boss, which may be not farther than the end of the boss D<sup>1</sup>; this range of adjustment being at least half the difference between the width of the narrowest  
45 and widest bed to which said device may be applied, so that by utilizing such

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adjustment at both ends the device may be accommodated to beds from the widest to the narrowest. For the purpose of journalling the shafts at the hubs D<sup>1</sup>, D<sup>1</sup>, on suitable supports, I provide clips, E, E, *etc.*, adapted to be clamped onto the side rails of the bed or mattress supporting spring, such clips having an inwardly jutting stud, E<sup>1</sup>, which enters the axial aperture in the boss D<sup>1</sup>, and so journals the crank shaft. Depending flanges of the angle irons which stiffen the plug-supporting perforated plate are apertured to receive the crank wrists, and two clips, E, E, are mounted on each side rail of the mattress supporting spring, at the same distance apart as the aperture for the crank wrists in said plug-supporting link; the corresponding clips on opposite side rails being of course mounted on the studs, E<sup>1</sup>, which constitute the journal bearings of the cranked shafts in line respectively, and the four clips being mounted at such position on the rails with respect to the position of the aperture in the mattress support and mattress, that when the cranked shafts thus constituted are rocked to swing up the plug supported on the link, C, said plug may enter and occupy the aperture. In order to make it practicable to get the opposite studs E<sup>1</sup>, E<sup>1</sup>, in line, notwithstanding the fact that the side rails B<sup>1</sup> when of wood are frequently warped and twisted more or less, I employ two screws, *e*, *e*, in one of the fork arms of the clip E, which may be set so as to protrude different distances and impinge on the rail and bind the clip to it with the studs projecting at the proper line. Only one screw, *e*<sup>1</sup>, need be used in the other fork arm of the clip. This feature of construction is shown in Figure 4. The same expedient adapts the clip for fastening to a tubular side bar, b<sup>1</sup>, as shown in Figure 6. In order to operate the cranked shaft, and thus carry the plug into and out of place, it is convenient to provide lever arms for the rock shafts other than the cranks; and since these lever arms, or one, at least, should be conveniently near the side of the bed, and must be rigid with the shaft, it is most convenient to form each of the cranks with such a lever arm, in addition to the crank proper to which the wrist is attached; and I have shown the fitting which constituted the crank made with such a lever arm, D<sup>4</sup>, rigid and integral with it. Such lever arm, for the purpose indicated, preferably extends obliquely downward from the axis of the rock shaft when the crank arm is extended horizontally, to uphold the plug so that it is at an angle of from 45° to 60° with the crank. Inasmuch as the mattress as a whole is usually provided with a spring support, as shown, and yields to the weight of the patient, it is important that the plug should be similarly yielding when it is in position in the mattress aperture, and in order to effect this result, since the plug is positively upheld by the cranked shafts described, those cranked shafts must in some manner be arranged to yield to any weight operating on the plug substantially as much as the mattress as a whole yields under the same pressure. For this purpose I provide an extensibly coiled spring, G, which may be hooked onto the side rail of the mattress supporting spring, and at its lower end hooked onto a lever arm, D<sup>4</sup>, which may be provided with a sidewardly jutting stud *d*<sup>3</sup>, for that purpose. The spring should be disengagable at one end or the other, in order to permit the rock shaft to be operated to withdraw the plug. Most conveniently the spring is made to be disengaged from the lever, being left suspended from the rail, and a hook, N, depending from the rail, engages the stud to hold the plug out of the way of the vessel.

Since the cranks D, D, are substantially horizontal, and so are all in one plane, and that the same plane as the link C, when the plug is fully elevated it is desirable to provide other connection between the two cranked shafts which shall be in a different plane at that stage. This is conveniently effected by providing a link, F, connecting the lever arms, D<sup>4</sup>, at either side of the bed, such link being in length between centers of the pivotal connection equal to the distance between centers of the shaft journal bearings, E<sup>1</sup>, E<sup>1</sup>, so that the link maintains at all stages a position parallel with the link C and the plug thereon, and prevents any unequal rocking of the two shafts which would cause or permit the plug to become otherwise than horizontal.



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For the purpose of handling a vessel to accommodate the patient, in lieu of bed-pan, and for lifting it up into and holding it securely in the mattress aperture, and for withdrawing it and carrying it out from under the bed, I provide a lever, H, fulcrumed at the universal joint *h* upon any fixed support, as upon  
 5 the side rail of the mattress supporting spring. This lever has one end extending out beyond the bed for convenience of operating, and the opposite end is bifurcated. The fork arms, H<sup>1</sup>, H<sup>1</sup>, have upwardly open notches, *h*<sup>1</sup>, *h*<sup>1</sup>, which afford lodgment for the trunnions *j*, *j*, with which the vessel K is provided, the provision for such trunnions being preferably made as illustrated, by fixing them  
 10 to the flexible strap J, which is buckled or otherwise secured around the vessel, as near the upper margin as convenient. In lieu of this expedient a basket or sling, J<sup>1</sup>, may be provided to hold the vessel, the trunnions *j* being fixed on the upper band, J<sup>10</sup>, of such basket or sling. (See Figure 5). It will seen that the vessel being suitably hung in the fork arms while the lever is in position to  
 15 permit this to be done conveniently, and that the lever may then be operated to carry the vessel around under the bed and up into the aperture in the mattress. In order to dispense with the necessity for holding the vessel in place during use, as might be done, I provide a poke or stilt, L, pivoted to the lever as near the point of support of the vessel thereon as convenient, and of such length that when  
 20 the foot of the stilt is on the floor, the vessel being upheld in the aperture of the mattress, the stilt is slightly inclined. With this construction when the attendant, by depressing the outer end of the lever, forces the vessel up firmly against the patient, the poke or stilt assuming less and less inclined position as the vessel is elevated, locks it up in the position to which it is thus lifted, and  
 25 holds it firmly. In order to lower the vessel notwithstanding this locking device, I connect to the stilt a cord or cable, M, which runs through suitable guide-eyes on the lever and extends down to a convenient position where it may be pulled by the operator while holding the lever handle, thus lifting one foot of the stilt from the floor and permitting the vessel to be lowered and swung out. The best  
 30 position for pivoting the stilt is as near as possible to the trunnion bearings, and I have therefore shown the stilt as forked at the upper end and spanning the vessel beneath its fork, being pivoted to the lower fork arms respectively directly under the trunnion bearings. It is also of some advantage to provide the stilt with more than a single foot, and particularly to provide it with two feet spread  
 35 transversely to the length of the lever; and I have so shown it.

Having now particularly described and ascertained the nature of my said invention and in what manner the same may be performed, I declare that what I claim is:—

1. In an invalid bed, means for supporting and moving a plug into and out of  
 40 a mattress aperture, which comprises cranked shafts on whose crank wrists the carrier for the plug is mounted, and means for releasably securing the crank wrists in position at which the plug is held in the aperture.

2. In an invalid bed in which the mattress rests on a spring support, means for supporting and moving a plug into and out of a mattress aperture, comprising  
 45 cranked shafts journaled between the aperture and one end of the bedstead, and arranged to carry the plug on the crank wrists as the shafts rock, combined with elastic means for upholding the wrists at the position at which the plug is in the aperture.

3. In an invalid bed, means for holding and moving a plug into and out of a  
 50 mattress aperture, consisting of cranked shafts having their wrists connected by a link-plate on which the plug rests and by which it is carried into and out of the aperture when the shafts are rocked, combined with suitable means for upholding the plate at the position at which the plug occupies the aperture.

4. In an invalid bed having an apertured mattress and a plug to close the  
 55 aperture carried on the wrists of parallel cranked shafts, a mode of constructing



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such shafts to adapt the device to be applied to beds of different widths and having the aperture at different positions in the width, which consists in making the shaft cranks each apertured at one end to receive the wrist portion and adapted at the other end to be journalled parallel to such wrists, and making the crank wrist of a rod extending through the wrist apertures of the cranks and securing 5 them adjustably in the same.

5. In an invalid bed in which a plug for closing a mattress aperture is carried on the wrists of parallel cranked shafts, means for journalling said cranked shafts to adapt them to rock in carrying the plug into and out of aperture-closing position in the mattress, which consists in providing clips mounted on the side 10 rails of the mattress support or bedstead, having bearings for the rock shafts, such clips having the aperture which receives the side rail provided at one end with two set screws adapted to impinge upon the rail at different positions in its width, so as to permit the clip to be adjusted to make the shaft bearing horizontal notwithstanding distortion of the rail. 15

6. In an invalid bed in combination with an apertured mattress and a support for the same correspondingly apertured, two parallel shafts extending across the bed and cranked or offset immediate their ends at a position corresponding to that of the aperture, a link connecting the wrists or offset portions, substantially equal in length to the distance between the shafts; and a plug supported on such 20 link, adapted to occupy the mattress aperture; one of the shafts having a lever arm, and a spring connected to the bed and to said lever arm to uphold the plug in the mattress, and disengagable at one end of said engagements to permit the plug to be lowered by rocking said shafts.

7. In an invalid bed, in combination with an apertured mattress and a support 25 for the same correspondingly apertured, two cranked shafts comprising cranks or lever arms, each apertured at one end to receive the wrist portion of the crank shaft and adapted at the other end to be journalled parallel to such wrists; clips adapted to be secured to the side rails of the bed or mattress support, and having suitable journal bearings for the said cranks; the crank wrist portions consisting 30 of rods adjustably extended through such apertures, and means for securing them therein; and a plug adapted to occupy the mattress aperture, mounted on such wrists, and suitable means for spacing the wrists a distance substantially equal to the distance between the journal bearings of the cranks on the clips.

8. In an invalid bed, in combination with an apertured mattress and support 35 correspondingly apertured, a vessel adapted to be inserted into the aperture having trunnions at opposite sides, a lever and a universal joint by means of which it is pivoted on the bed or mattress support, such lever having a forked terminal whose fork arms afford pivotal trunnions for the vessel.

9. In an invalid bed, in combination with an apertured mattress and support 40 for the same correspondingly apertured, a vessel adapted to be entered in the aperture and provided with opposite trunnions, a lever fulcrumed on the bed or mattress support, and having forked terminal whose fork arms afford pivotal bearings for the trunnions of the vessel, and a poke or stilt pivoted to the lever and adapted to rest upon the floor in slightly inclined position when the vessel 45 is inserted in the aperture of the mattress, whereby such poke or stilt serves to uphold the vessel at varying heights within a limited range of adjustment.

10. In an invalid bed, in combination with an apertured mattress and a support for the same correspondingly apertured, a vessel adapted to enter the aperture having opposite trunnions; a lever fulcrumed on the bed or mattress support 50 and bifurcated at one end, and having its fork arms provided with notches open in direction to afford lodgment for the vessel trunnions; said lever having universal joint connection at its fulcrum, whereby it is adapted to carry the vessel up into the aperture and down out of the same, and thence laterally from under the bed.

11. In an invalid bed in combination with an apertured mattress and a sup- 55



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port for the same correspondingly apertured, a plug for closing the aperture and means for operating the plug to insert and withdraw it consisting of parallel cranked shafts journalled underneath the mattress support, having the plug mounted on the crank wrists or offset portions, such wrists consisting of rods  
5 adjustably secured to the crank arms, to permit the latter to be spread and approached to adapt the structure to beds of different widths.

12. In an invalid bed, in combination with an apertured mattress and a support for the same correspondingly apertured, a plug for closing the aperture, and means for operating the plug to insert and withdraw it, consisting of parallel  
10 cranked shafts journalled underneath the mattress support; a link connecting the wrists or offset portions, and arranged to carry the plug, such link being laterally movable on the crank wrist, and adjustable stops on the wrist to retain it as adjusted.

Dated at Chicago, Illinois, United States of America, this 23rd day of October,  
15 ber, A.D. 1901.

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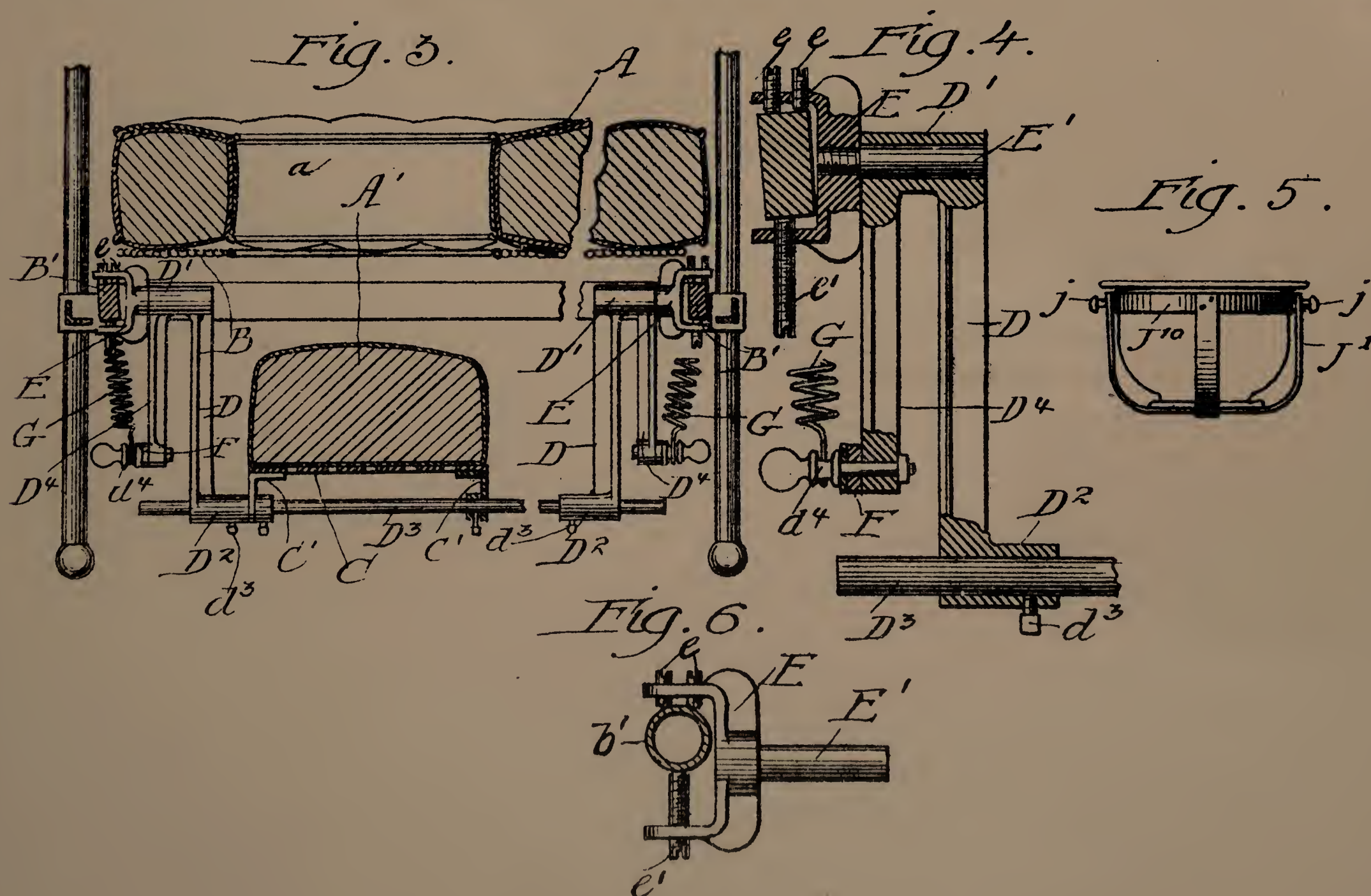
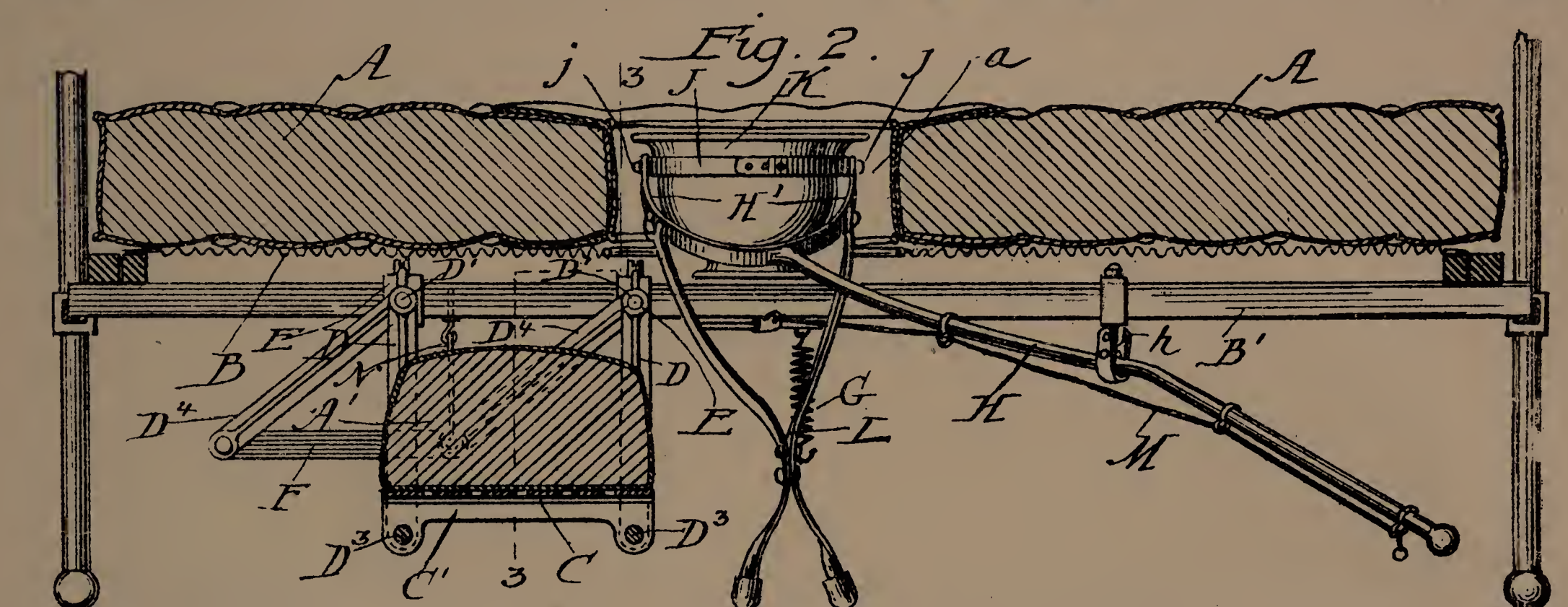
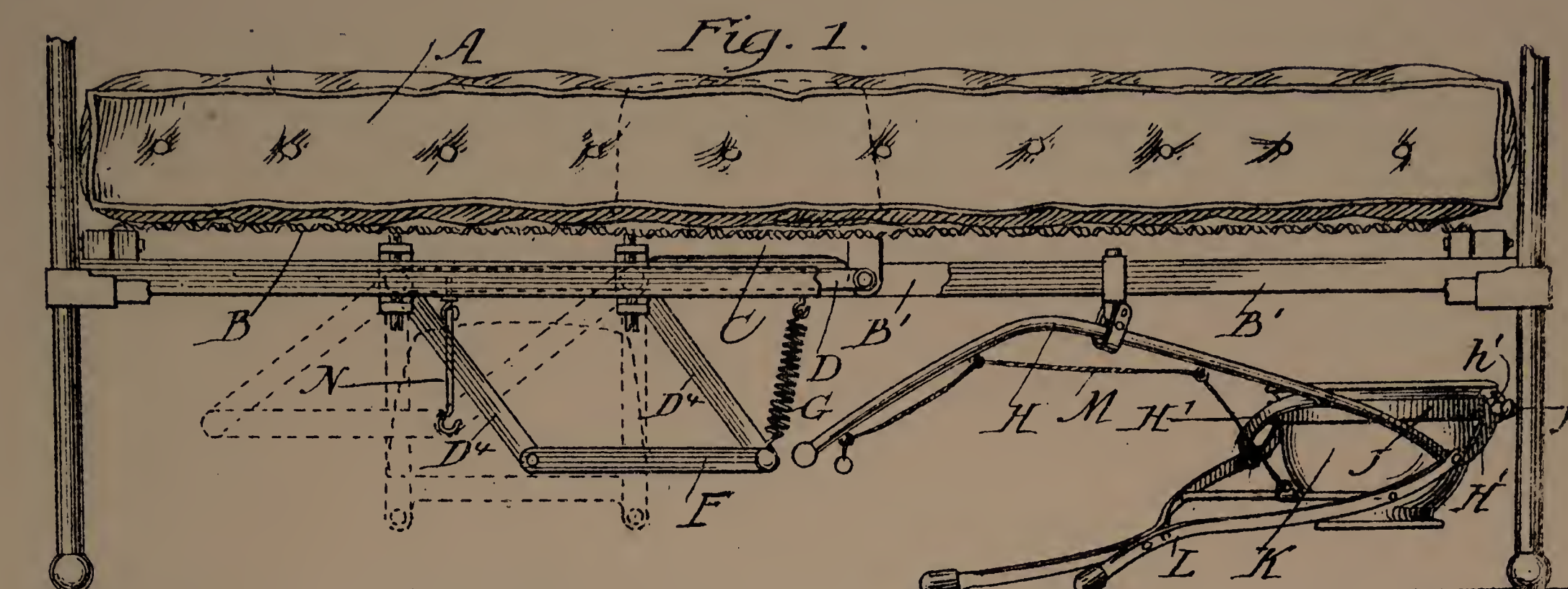
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*[This Drawing is a reproduction of the Original on a reduced scale.]*



